UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,078	04/15/2004	William F. Northrop	3402.1019-001	7170

21005 7590 06/11/2007

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.
530 VIRGINIA ROAD
P.O. BOX 9133
CONCORD, MA 01742-9133

EXAMINER	
PATEL, VINIT H	

ART UNIT	PAPER NUMBER
1764	

MAIL DATE	DELIVERY MODE
06/11/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/825,078	NORTHROP ET AL.	
	Examiner	Art Unit	
	Vinit H. Patel	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *26Oct05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "easily disengageable" in claim 1 is a relative term which renders the claim indefinite. The term " easily disengageable " is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claims 2-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention based on depending from rejected claim 1.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1--- are rejected under 35 U.S.C. 102(b) as being anticipated by Edlund et al. ("Edlund"), US 20010045061A1.

Regarding the following claims:

1. Edlund discloses a modular fuel reformer (Fig. 9) comprising: a fuel reformer assembly comprising a cavity (0056, Fig. 9); a removable carrier comprising at least one fuel reformer module (0059), the carrier connecting to the fuel reformer assembly to enclose the at least one module within the cavity (0060, Fig. 9); and a connector 120 engageable to secure the carrier (Fig. 9) and the fuel reformer assembly in fluid-tight relationship and easily disengageable to permit removal of the carrier from the fuel reformer assembly (0056-0061, Fig. 9).

2. The modular fuel reformer of claim 1, wherein the at least one module comprises a catalyst (0059).

3. The modular fuel reformer of claim 2, wherein the catalyst comprises at least one of a fuel reforming catalyst 32 (Fig. 9), a water gas shift catalyst 38 (Fig. 9), a catalyst for removing carbon monoxide or other contaminants 48 (Fig. 9) , and a catalytic burner catalyst (0063, See Fig. 10).

4. The modular fuel reformer of claim 1, wherein the removable carrier comprises a portion extending 120 outside the cavity to facilitate removal of the carrier from the fuel reformer assembly (0059, Fig. 9).

5. The modular fuel reformer of claim 1, wherein the carrier and the cavity are generally cylindrically shaped (shell 31, Fig. 10), and the carrier fits concentrically within the cavity (0062, Fig.10).

6. The modular fuel reformer of claim 1, wherein the carrier comprises a flange 120 or 134 (a suitable fitting) that contacts a surface of the fuel reformer assembly to

connect the carrier to the fuel reformer assembly (0059, 0062Fig 9 or Fig. 10).

7. The modular assembly of claim 6, further comprising a gasket positioned between the flange and a surface of the fuel reformer assembly (0028, 0059, fittings 120).

8. The modular assembly of claim 1, wherein the connector comprises at least one of a flange with bolt holes, a clamp, a latch, a retaining spring, a threaded connection, a nut and stud, a pin, a bayonet-type engagement, a retaining ring, a chuck or collet, and a crimped disposable connector (0059, listing examples fittings 120).

9. The modular assembly of claim 2, wherein the interior of the fuel reformer cavity comprises a catalyst 32 (Fig. 9).

10. The modular assembly of claim 9, wherein the module catalyst is adapted to facilitate a low temperature water gas shift reaction, and the catalyst on the interior of the fuel reformer cavity is adapted to perform a preferential oxidation reaction (0033, Fig. 4).

11. A method for improving the serviceability of a fuel reformer, wherein the reformer contains one or more functional modules requiring service, the method comprising the steps of: placing at least one module in a carrier (0059); and providing one or more connecting means for connecting the carrier to the remainder of the reformer 120 (0059), wherein the connecting means are selected to allow the connection between the carrier and the reformer to be made and broken in a reversible manner (0059).

12. The method of claim 11 wherein a module comprises a catalyst 34 (Fig. 10).

13. The method of claim 12 wherein a catalyst is in pelletized form 34 (Fig. 10).

14. The method of claim 12 wherein the catalyst 34 is supported on a monolithic substrate (Fig. 10).

15. The method of claim 11 wherein the carrier is a removable piece that has at least a portion of the connection means at one end of the carrier (Fig. 9, 0059-60).

16. The method of claim 11 wherein the carrier is concentric with the reformer (Fig. 10).

17. The method of claim 11 wherein the carrier is concentric with at least one section of a reformer having more than one section (Fig. 10).

18. The method of claim 11 wherein the carrier comprises one or more modules having functions selected from non-catalytic combustion 77, steam generation, heat exchange, impurity absorption, mixing, fluid distribution, and insulation (0063).

19. The method of claim 11 wherein the connecting means between the carrier and the remainder of the reformer comprises at least one of a flange with bolt holes, a clamp, a set of latches, a set of retaining springs, a threaded connection, nuts and a set of studs, pins, bayonet-type engagements, retaining rings, a chuck or collet, a disposable piece providing a crimped connector that can be uncrimped or cut to allow removal of the carrier; and combinations of these (0059,0062, listing examples fittings 120).

20. The method of claim 11 wherein the modules are secured to the carrier by a reversible means (0062, Fig. 10).

21. The method of claim 11 wherein the catalyst modules are secured to the

carrier by an irreversible means (Fig. 10).

22. The method of claim 11 wherein the carrier is a catalyst module (Fig. 10, 0063).

23. The method of claim 11 wherein the carrier consists of two halves and at least one module is placed in the perimeter of the first half, and then the second half is joined to the first half, compressing the module so as to retain it in place (0065, Fig .11).

24. The method of claim 11 where a module contains a catalyst selected from a fuel reforming catalyst 32 (Fig. 9), a water gas shift catalyst 38 (Fig. 9), a catalyst for removing carbon monoxide or other contaminants 48 (Fig. 9), a catalytic burner catalyst (0063, See Fig. 10) and a contaminant removal catalyst 60 (Filter, 0060).

25. A fuel reformer, the reformer characterized in having at least one functional module mounted in a carrier (Fig. 9), wherein the carrier is arranged so that it can be removed from the reformer by the disconnection of reversible connection means (0057-0059).

26. The reformer of claim 25 in which the connection means between the carrier and the reformer comprises at least one of a flange with bolt holes, a clamp, a set of latches, a set of retaining springs, a threaded connection, nuts and a set of studs, pins, bayonet-type engagements, retaining rings, a chuck or collet, a disposable piece providing a crimped connector that can be uncrimped or cut to allow removal of the carrier; and combinations of these (0028, 0059, listing examples fittings 120)..

27. The reformer of claim 25 wherein a module contains a catalyst selected from a fuel reforming catalyst 32 (Fig. 9), a water gas shift catalyst 38 (Fig. 9), a catalyst for

removing carbon monoxide or other contaminants 48 (Fig. 9), a catalytic burner catalyst (0063, See Fig. 10) and a contaminant removal catalyst 60 (Filter, 0060).

28. The reformer of claim 25 wherein a module has a function selected from non-catalytic combustion 77, steam generation, heat exchange, impurity absorption, mixing, fluid distribution, and insulation (0063).

29. The reformer of claim 27 wherein the catalyst is supported on a monolithic substrate or is in pelletized form (Fig. 10, showing reforming catalyst 34 is in pellet form).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinit H. Patel whose telephone number is (571) 272-0856. The examiner can normally be reached on 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

vhp

Glenn Caldarola
Supervisory Patent Examiner
Technology Center 1700